

Climate Change and Pests: Monitor, Mitigate, Manage



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Kudzu and warming temperature:



Kudzu, the vine that ate the south.

Where was kudzu growing in 1971?

Data are from Clyde Reed,
a USDA scientist. Published
in “Common Weeds of the
United States.

Focus on mid-western
populations, away from
urban centers or mountains.

Are warmer winters contributing
to northward migration of kudzu?



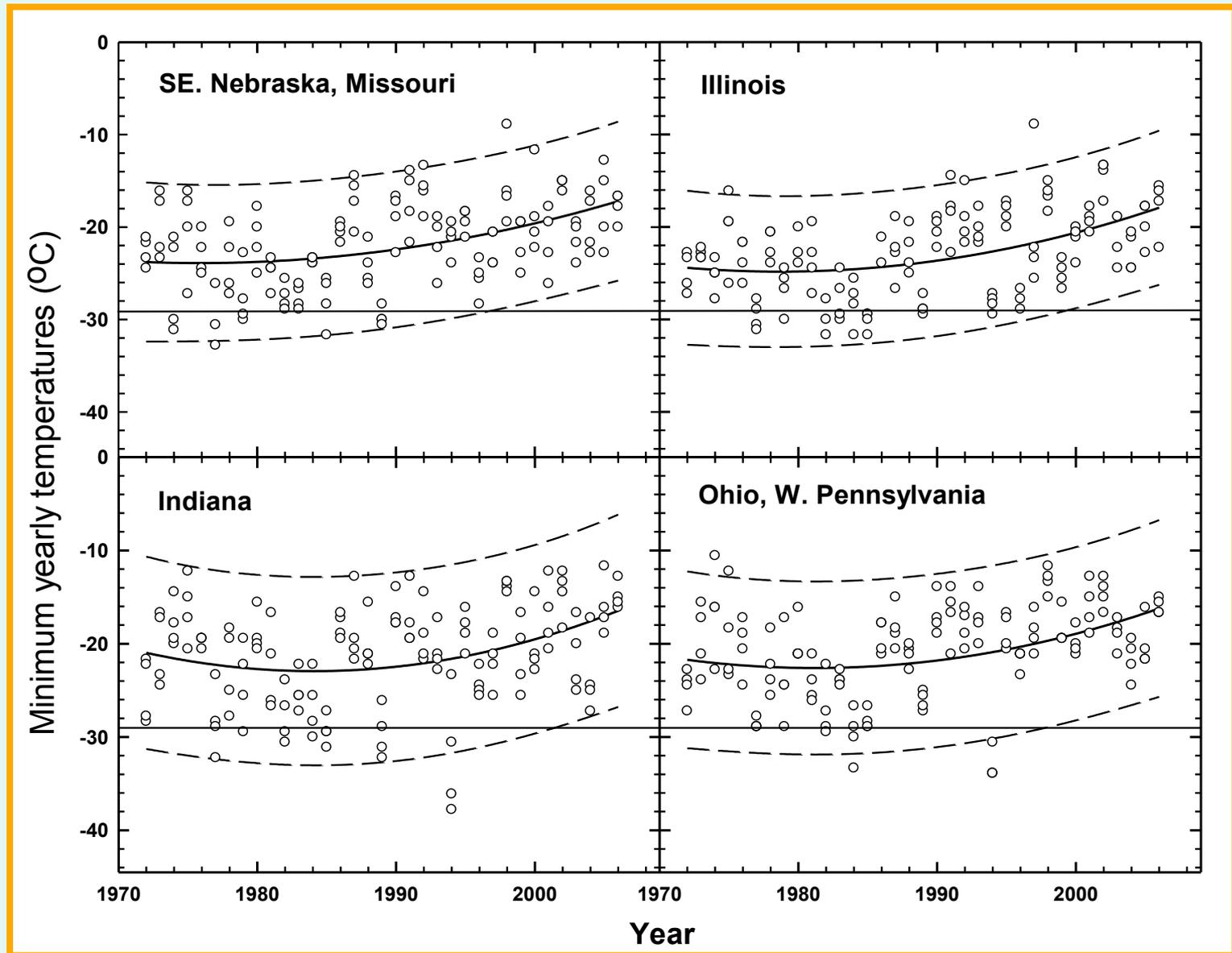
What is the thermal limit for kudzu? Does it vary depending on population?

Examined 8 populations throughout the U.S., over a 1300 km N-S transect. Vegetative stems (asexual reproduction at N limit).

RC	Tissue Temp. (oC)
0.10	-7.0+0.9°
0.25	-10.8+0.9°
0.50	-16.1+0.8°
0.75	-21.7+1.0°
0.95	-28.6+1.1°

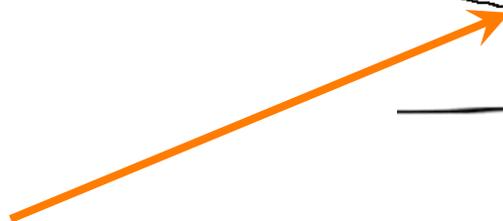


Has the minimum temperature threshold changed?

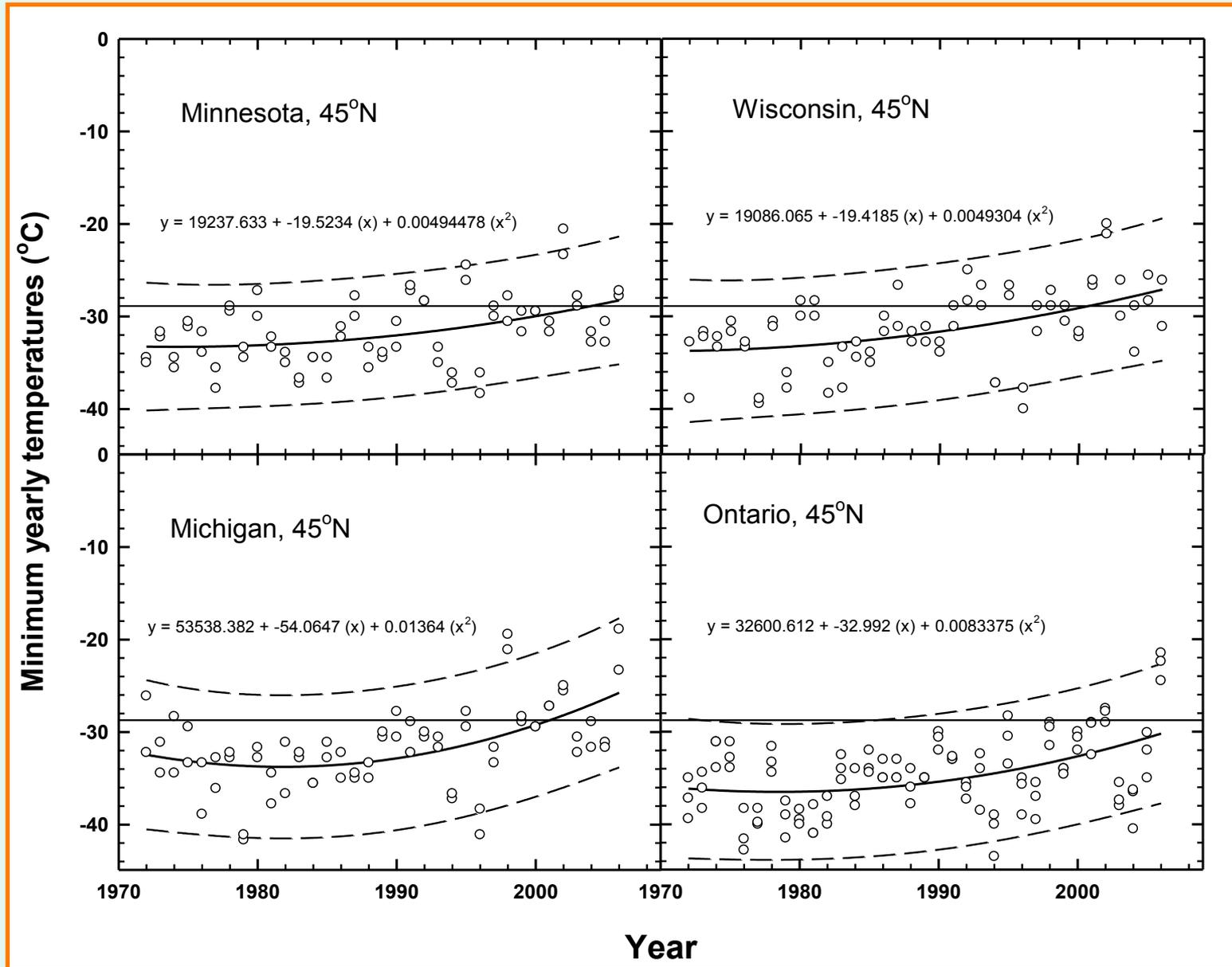


How will it change in the future?

45oN

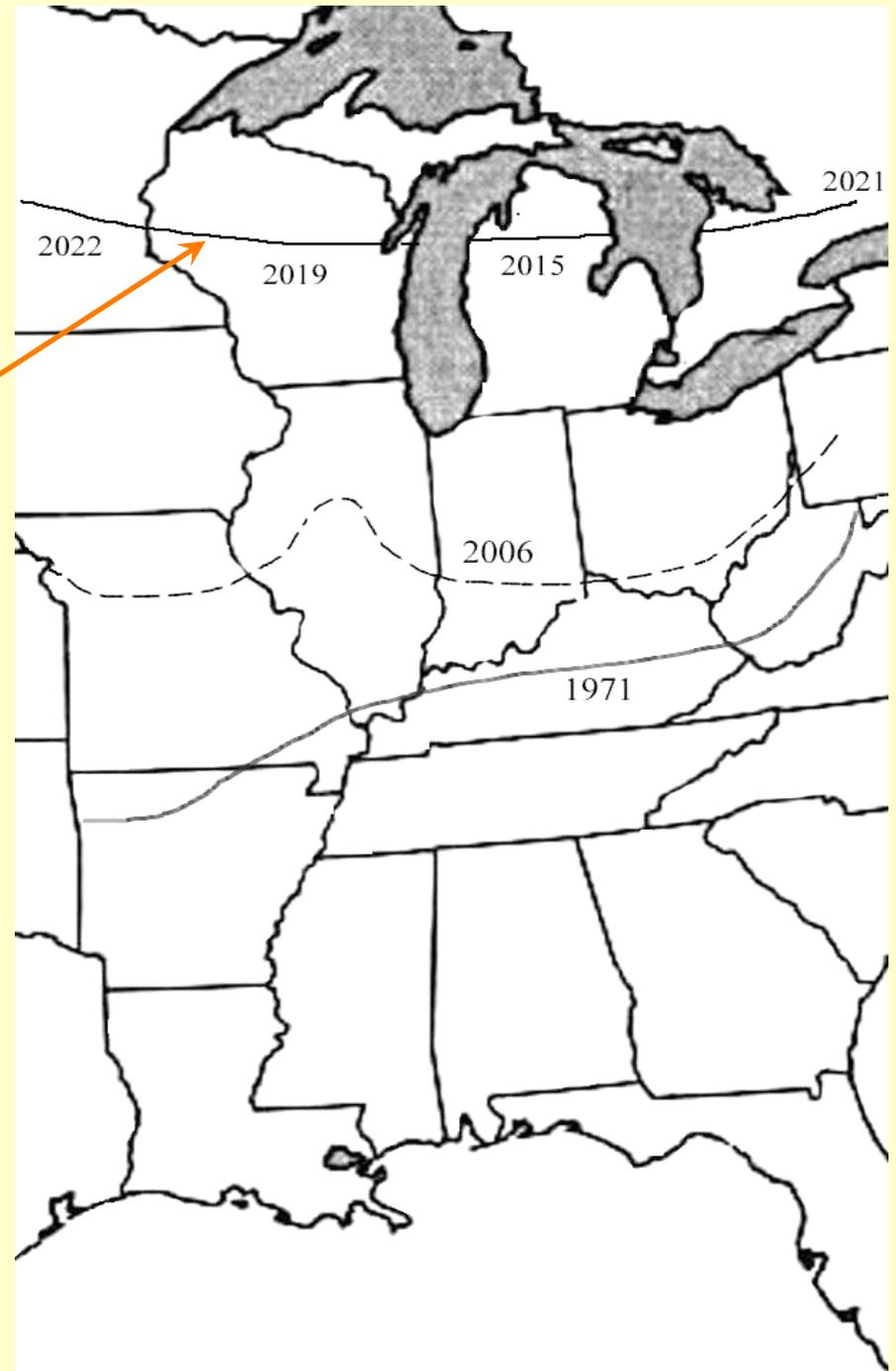


When will the minimum temperature threshold change?

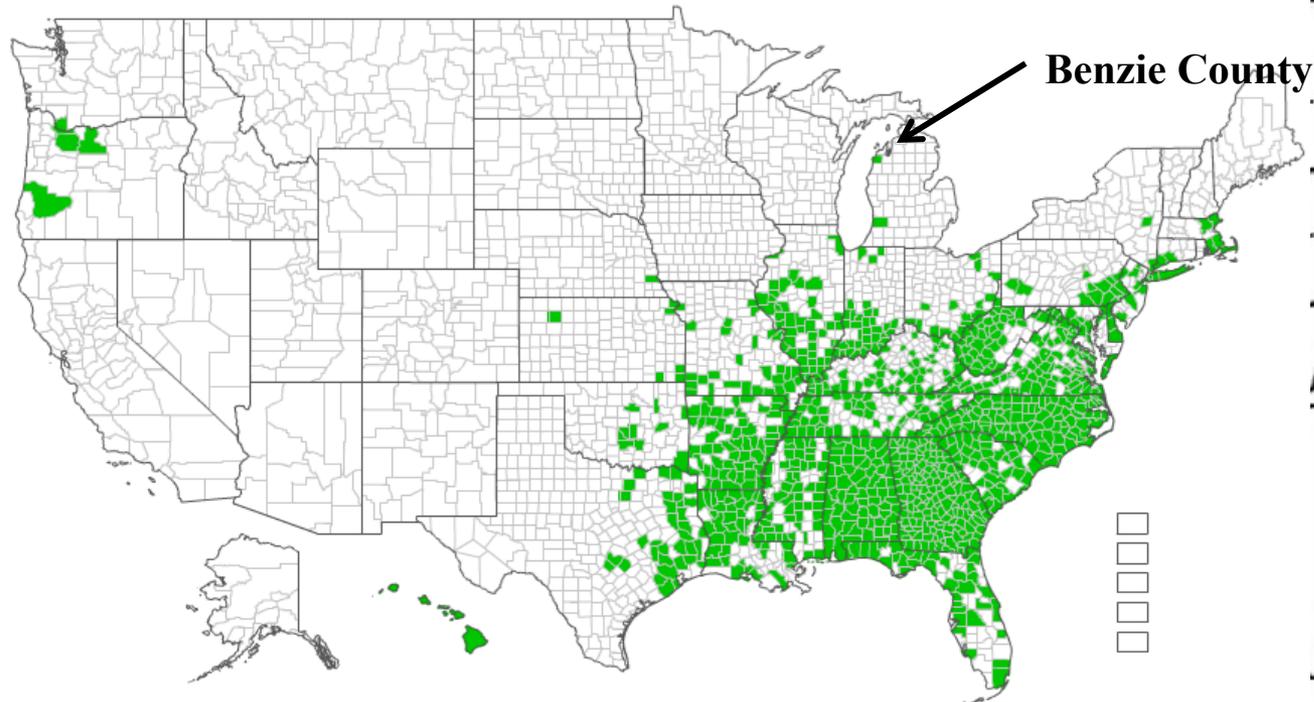


Where will kudzu be
in the future?

Date at which there is a <5% chance
of location experiencing a temperature
below the -28°C threshold.



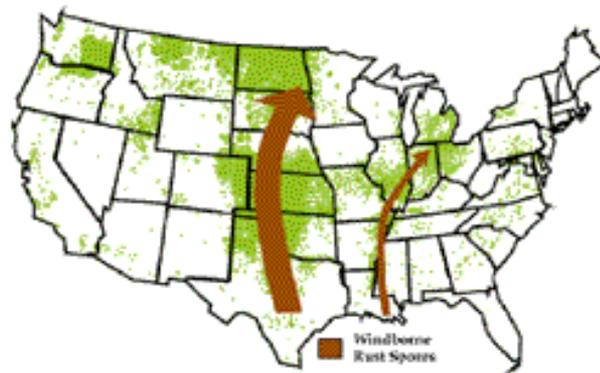
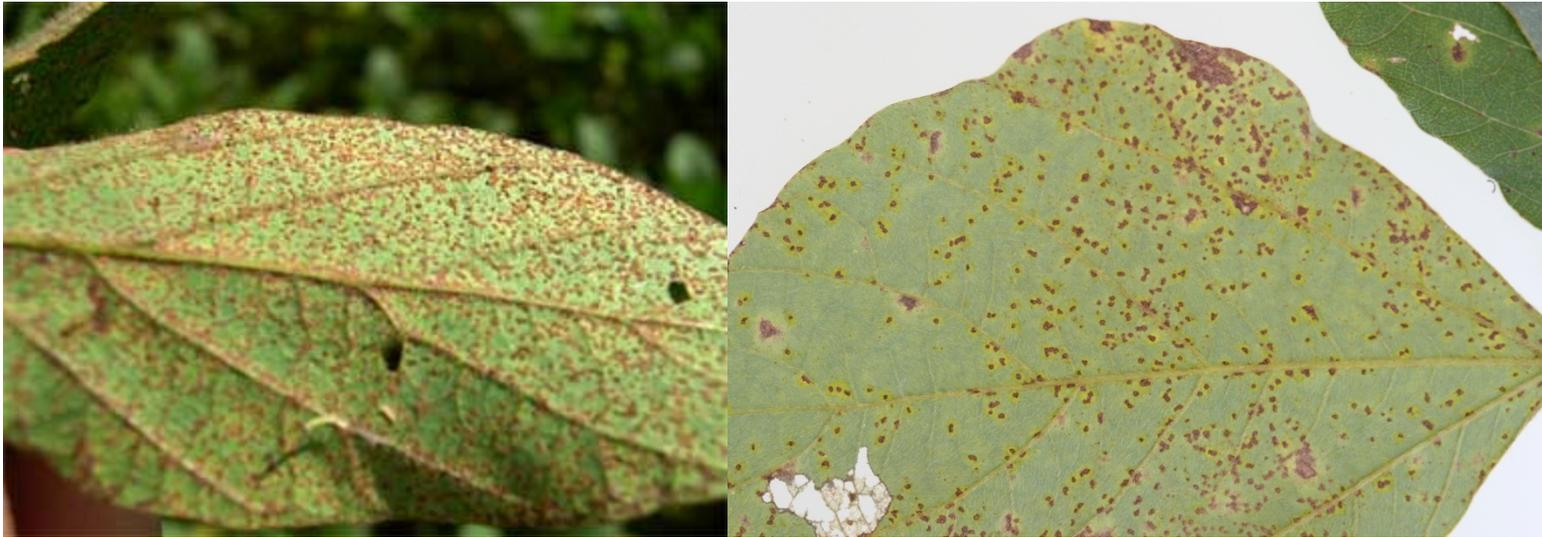
Kudzu: Distribution and Warming winters.



Northern range of

From EDDmapS

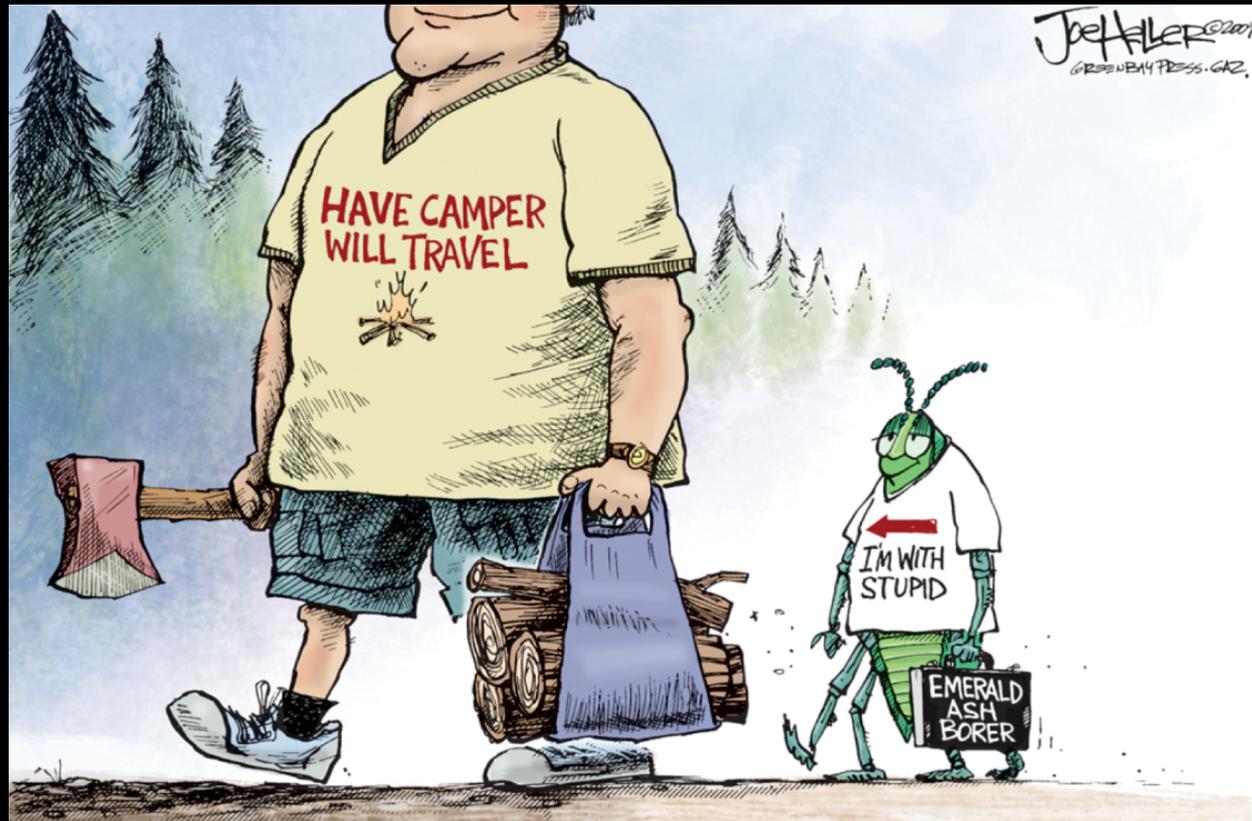
Climate and Kudzu and ?



Monitor: Kudzu and warming winters.

- As winter temperatures warm, Kudzu appears to be expanding since the 1970s.
- Likely that other pests, i.e., weeds, insects, disease, etc. are also moving.

What are the implications of climate change for pest management?



Pest Constraints: 1. MONITOR



Marine Regions (VLIZ)

2. MITIGATE

AREA INFESTED



3. MANAGE



1. Physical
2. Biological
3. Cultural
4. Pesticides

What tools are available? When should you use them?

Integration of IPM methods to assess emerging, climate-driven threats.

Some Thoughts on Management

- ▶ **Monitor:** *Forewarned is forearmed, and the past is no longer prologue.*
- ▶ **Mitigate:** *Proactive is better than reactive.*
- ▶ **Manage:** *Many tools in the toolbox.*

Ziska and McConnell, 2015, Journal of Agriculture and Food Chemistry.

AND???????